DEPARTMENT OF THE NAVY
NAVAL ELECTRONIC SYSTEMS COMMAND
WASHINGTON, D.C. 20360

NAVELEX INST 5100.2
ELEX 0516
1 July 1968

NAVELEX INSTRUCTION 5100.2

Ch-1 25 Sep 68

From: Commander, Naval Electronic Systems Command
To: Distribution List

Subj: Radioluminescent Materials; Control Of

Ref: (a) NAVELEX INSTRUCTION 5100.1
(b) Radiation Health Protection Manual NAVMED P-5055

Encl: (1) "Work Area Procedures For Control of Radioactive Contamination From Radioluminescent Material" dated 14 June 1968

1. Purpose. The purpose of this instruction is to establish policy on the control of contamination from radioluminescent materials and on related decontamination and disposal procedures.

2. Cancellation. BUSHIPS INSTRUCTION 5100.16 of 24 April 1963 (NOTAL) is hereby cancelled.

3. Background. Spaces in Instrument Repair Shops and other areas where instruments containing radioluminescent material are repaired may become radioactively contaminated from the radioluminescent material. Reference (a) provides general guidelines to all ships and stations for the safe handling of radioluminescent materials and requires that such instruments be worked on only by activities qualified in accordance with this instruction. Items likely to contain radioluminescent material include clocks, compasses, depth-gauges, wrist-watches, alidades, and other instruments or dial-faces intended for use in darkness.

4. Action. Commands having repair facilities working, or likely to work, on radioluminescent materials shall designate specific areas for such work, requiring that the procedures of enclosure (1) be followed in those areas. When this is accomplished, the Command's Radiological Safety Officer, designated in accordance with Section 1-5(16) of reference (b) shall certify to NAVELEX (Naval Electronic Systems Command) ELEX-0516 that the facility is qualified to work on radioluminescent materials. This certification shall include:

a. A brief description of the work area.

b. Types and quantities of radiac on hand in the work area.

c. Physical and organizational location of the work area.

d. Name(s) of person(s) in charge of the work area.

H. C. MASON
Vice Commander

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WORK AREA PROCEDURES FOR CONTROL OF RADIOACTIVE CONTAMINATION FROM RADIOLUMINESCENT MATERIAL

1. Specific areas and persons shall be designated for the repair of items containing radioluminescent material. When the facility so designated is qualified in accordance with NAVELEXINST 5100.2 it shall be so posted.

2. The work area shall be monitored daily for surface contamination for as long as items containing radioluminescent material are being worked on. At other times, it shall be monitored weekly wherever radioluminescent material is stored. Items containing radioluminescent material shall be monitored for contamination upon receipt and again upon release from the work area. Monitoring shall cover: All exposed surfaces of the spaces and all equipment therein; and drawers and shelves containing radioluminescent materials. The following criteria shall be met for any material or equipment to be considered non-radioactive or for any space in the work area to be considered an uncontrolled space:

   a. The highest radiation level shall not exceed one tenth of one milliroentgen per hour (mr/hr) above background as determined by an open-window beta-gamma radiacmeter (AN/PDR-27 series or other instrument of equivalent sensitivity) held approximately one inch from the surface being surveyed.

   b. The loose radioactive surface contamination shall not exceed 450 micromicrocuries beta-gamma activity above background when measured on a dry filter paper wiped over one hundred square centimeters of the surface being surveyed or over the total surface if less than one hundred square centimeters (see NAVMED P-5055 1-5(8) as revised). The measurement shall be made on beta-gamma counting equipment required for making wipe test measurements and performed by personnel specifically authorized to do so. If this capability does not exist at the activity where the swipes are taken, the swipes shall be transported in leak-proof plastic bags, marked as radioactive, to an activity possessing suitable equipment (e.g., Radiac Repair Facility).

   c. Alpha radioactivity shall be undetectable, using an AN/PDR-56 series alpha radiacmeter, or instrument of equivalent sensitivity, either by direct alpha radiation measurement of the surfaces being surveyed or by alpha measurement of the dry filter paper used for the measurement in 2.b above.

3. If any surface in the work area exceeds the limits specified above, the affected space should be designated as a controlled contamination area. Access to the area should immediately be controlled to allow

only personnel in anti-contamination clothing to enter. If the area must be controlled for more than several hours, barriers should be erected and if practical the space should be locked when unoccupied. Signs should be posted conspicuously and should state the access restrictions, anti-contamination clothing requirements for access, level of loose surface contamination, radiation dose rate, and type of radiation.

4. Any item containing radioluminescent material which does not meet the criteria in paragraph 2 above shall be marked with the standard radiation symbol and the words "Caution-Radioactive Material."

5. The following safety precautions in addition to those outlined in NAVELEX INSTRUCTION 5100.1 shall be followed in the handling of radioluminescent material:

a. Protection of Personnel. When handling components bearing radioactive material, wear gloves to prevent contamination of the hands. Provide each worker with washable work clothing (as distinguished from ordinary street clothing) while actively engaged in the repair and handling of radioluminescent parts. Provide masks or respirators for workers if there is likelihood of radioactivity dusting or otherwise becoming airborne. Workers should wash hands after handling radioactive material.

b. Covering of Surfaces. Avoid the use of wooden work benches, wooden drawers, and wooden shelves which are difficult to decontaminate. Components should be dismantled and disassembled over a piece of disposable absorbent paper. The components should be monitored after the radioactive parts are removed. Should the body of the component be contaminated and not reusable it should be placed in a plastic bag, marked radioactive and transferred to the nearest naval supply activity for ultimate disposal in accordance with NAVSUP INSTRUCTION 4510.27 of 3 January 1968. After use the absorbent paper should be similarly bagged and disposed of; other potentially contaminated surfaces should be cleaned.

c. After all radioactive material and surfaces have been bagged, covered, or cleaned so as to prevent further spread of contamination, requirements for gloves and other anti-contamination clothing may be lifted. Contaminated gloves and anti-contamination clothing shall be collected in plastic bags for subsequent laundry or for disposal.

6. Decontamination. The need for decontamination may be minimized by covering surfaces and equipment or by taping the handles of tools prior to use and removing the contaminated covering or tape after use. During decontamination, precautions should be taken to limit the spread of surface contamination such as by taking care not to splash

solutions. Emphasis should be on taking up the contamination rather than on washing it down. Gummed tape may be used to lift contamination from surfaces. If large variations in surface contamination levels exist on a surface, cleaning generally is done from less contaminated toward more contaminated areas. Ventilation may be required to minimize the contamination breathed by personnel performing decontamination, although ventilation may have to be secured or filtered in some cases to limit the spread of contamination to other areas. Decontamination shall be in accordance with the following:

a. Wounds. Radioactively contaminated wounds of any kind shall be decontaminated under the direction of medical personnel. Medical attention should be obtained promptly if wounds are contaminated to avoid having the radioactive material absorbed into the body.

b. Skin. Skin should be decontaminated using soap and water. Scrub brushes should not normally be used since it is relatively easy to abrade the skin and thus work contamination into the skin. Washing should be repeated several times, monitoring after each washing. If these procedures are not sufficient, further decontamination should be performed under the direction of medical personnel. Spot cleaning to remove local hot spots should be done before showering to avoid spread of contamination over the entire body.

c. Clothing. Contaminated personal clothing and anti-contamination clothing shall be decontaminated or disposed of. Activities not equipped with radioactive clothing laundry facilities should store contaminated clothing and masks in plastic bags and have it laundered by activities possessing such facilities. If necessary, activities not equipped with a decontamination laundry may use normal laundry facilities for clothing and masks contaminated to a level less than 0.1 mrem per hour. Laundry water need not be monitored before discharge under these special circumstances since it would not exceed discharge limits at these low levels of contamination. The possibility of contaminating laundry machines is slight in this case, but washing machines should be washed out before subsequent use on uncontaminated laundry. This washing may be performed by running the machine through a washing cycle with no clothes inside. The machine should be checked for contamination before re-use on uncontaminated laundry by analyzing swipes from inside the machine.

d. Decontamination of surfaces and equipment. Work benches, compartment surfaces, tools and equipment can usually be decontaminated by ordinary cleaning methods. In general any procedures which will remove the surface dirt will remove surface contamination.

In all cases where liquid is used in decontamination care should be taken to avoid spreading radioactivity. Washing with soapless detergent in water is generally an effective decontamination method. If contamination levels are not specifically reduced, use of solvents, strong chemicals, and mechanical removal of some of the surface may be necessary. If contamination levels are low, wiping with a cloth may provide sufficient decontamination. Organic solvents may be used for machinery with greasy or oily surfaces. Acid is only used when it will not damage the equipment. On paint or covered surfaces, if washing will not remove the contamination, the paint or covering may need to be removed to effect decontamination.

7. Disposal of radioluminescent items and wastes shall be in accordance with NAVELEX INSTRUCTION 5100.1